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ABSTRACT

Two related studies were undertaken at Southern Illinois University on how students in the School of Medicine use the instructional objectives faculty prepare for them. Students in the classes of 1978 and 1979 were surveyed in their final month of training. The second survey was modified, based on responses from the first. The five research questions were: (1) How much do students use objectives? (2) How do they use objectives? (3) What factors influence this use? (4) What are student attitudes toward objectives? and (5) Do students feel objectives inhibit their learning in any way? Results show that although objectives are perceived essential early in the curriculum, they decreased in effectiveness throughout the four curriculum sequences. It is concluded that in the future the emphasis on objectives will be reduced, and more emphasis placed on other instructional elements to assure that evaluation, both clinical and nonclinical, will be appropriate to objectives and learning experiences. Appended charts and tables present collations of responses on objectives' usefulness in the curriculum sequences and in each clerkship; reasons for using objectives; and agreements and disagreements with statements about objectives and their use. (MSE)

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# HOW MEDICAL STUDENTS USE OBJECTIVES

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In this paper I will briefly summarize two related studies done at the SIU Medical School on how our students use the instructional objectives faculty prepare for them. Then I'd like to tell you how we interpret these findings and what we plan to do about them.

When talking about objectives in 1980, I am reminded of a statement by B.F. Skinner. Reflecting on the programmed learning movement after a decade, he commented: "Those who have had something to say have said it far too often, and those who had nothing to say have been no more reticent." Nevertheless, I will plunge ahead because objectives have an important role in instruction, and a potential that is often unfulfilled.

Southern Illinois University School of Medicine is a rare laboratory for the study of instructional objectives, because it's entire three-year undergraduate curriculum is objectives based. The SIU program is divided into Sequence I, 12 months, basic sciences; Sequence II, 6 months of pre-clinical sciences; Sequence III, 12 months of hospital-based clinical clerkships; and Sequence IV, 5 months of primarily clinical electives. The administrative unit of learning in the first three sequences is the module. Objectives are provided for students in all learning modules. These objectives are stated in terms of what students are expected to be able to do and they represent all taxonomic levels of learning. Frequent evaluations of mastery of the objectives determine students' progress through the curriculum. All objectives, instructional activities and measurement techniques are under periodic assessment and revision. This massive development and update process has been supported by strong administrative commitment and by a Department of Medical Education consisting of some fifteen educational psychologists and instructional developers.

The present study was motivated by practical questions in that department: How much effort should we give to continuous review and update of objectives? What investments will yield the greatest payoff in student learning? I admit that a secondary motivation was to answer some of our faculty who are critics of objective-based instruction.

The specific questions we sought to answer were: a) to what extent do students use the objectives included in each module? b) does their pattern of using objectives change as they proceed through the curriculum? c) what factors influence their use of objectives?

Note that this research only examines student use and perceptions of objectives. Other research at SIU is currently underway to examine faculty use of objectives and how faculty use of objectives influences instruction.

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METHOD

To identity the issues involved in student use of objectives, small group interviews were conducted with 20% of the Class of 1978 who were willing to discuss their use of goals. I will use the word "goals" interchangeably with "objectives" since "goals" is the word that has stuck with SIU students and faculty. We then mailed a questionnaire based on these interviews employing both open-ended and scaled items to the entire class of 58 students in their final month of medical school. A second questionaire containing some repeated items and some new items was mailed to the Class of 1979 (75 students) in their final month. The new items were designed to answer questions raised by students' responses in the first study.

RESULTS

The first questionnaire yielded an 81% response (n=47) and the second questionnaire a 75% (n=56) response.

First, how much do SIU students use objectives? Like so many first draft research questions, this turned out to be too simple a question to ask. The student responses shown in Figure 1, are grouped by Sequence (or section of the curriculum). The distributions of the responses showed marked differences among sequences. On a scale of 1-5 (where 1 was "Detrimental", 2 was "No Effect", and 5 was "Essential") students most often saw objectives as essential in Sequence I, somewhat less useful in Sequence II, and having no effect in Sequence III. (The interview had shown that objectives were not used at all in Sequence IV where, in fact only a few electives had formal objectives.) No students rated objectives as detrimental in Sequences I or II and only two rated them detrimental in Sequence III.

Results from the first questionnaire, which asked for individual ratings on each of the clerkships, (see Figure 2) showed major differences among clerkships. The ratings ranged from a modal response (70%) of "Essential" in one clerkship to a modal response (64%) of "No Effect" in another clerkship.

To further explore the reasons for using objectives less in the clinical year, we asked students to rate the importance of various possible reasons on the second questionnaire. The major factors (see Table 1) were the fact that objectives were not tested in Sequence III and that faculty minimized the importance of objectives.

Second, we wanted to determine how students used objectives. We asked open-ended questions in the first questionnaire, and used the responses to construct nine scaled statements characterizing methods of using objectives for the second questionnaire (see Table 2). These ratings identified the students' predominant modes of using objectives in all sequences as a) reading the objectives before the initial reading of the study material, and b) self-testing with the objectives after reading the material. The use of study groups was also common in Sequence I, where students wrote answers to some objectives and shared these answers with their study group. Student formulation of personal objectives occurred fairly infrequently in Sequence I ($\bar{x}=2.27$) and Sequence II ($\bar{x}=2.47$) but increased considerably in Sequence III ($\bar{x}=3.31$).

Third, what factors influence student use of objectives? We asked students to rate whether each of a number of factors tended to increase or decrease his use of objectives. The results (presented in Table 3) showed that the primary variable which increased student use of objectives was the expectation of testing over material represented in the goals. Further, when the frequency of testing increased, the student use of goals also increased. A second important variable was the "usability" of the objectives; clarity, conciseness, a good match between objectives and reading material, and goals which required oneword answers all tended to increase student use. Conversely, having only a few broad, general objectives tended to decrease use. Interest in and prior knowledge of the material did not seem to affect goal usage.

Fourth, students were asked to rate their agreement or disagreement with several statements about objectives, which are shown in Table 4. Students reported that testing was most consistent with objectives in Sequence I ($x=3.90$ on a scale of 1 to 5), less so in Sequence II ($x=3.29$), and not at all consistent with objectives in Sequence III ($x=1.19$). They perceived objectives as helping more in learning factual material ($x=4.03$) than in conceptual learning ($x=3.21$) or integration ($x=3.21$). Students strongly agreed that objectives promoted efficient use of study time ($x=4.18$). The greatest agreement reported was that some subjects lend themselves better to goals than others ($x=4.64$).

Finally, students were asked whether objectives inhibited their learning in any way and, if so, how. Of the 101 respondents to this question, 71% responded "no," 23% responded "yes," and 6% were ambivalent. Comments from students who reported that their learning was not inhibited by objectives suggested that if and when they found the goals to be inhibiting, they stopped using the goals. Comments from students who reported that their learning was inhibited by objectives suggested that they sometimes did not go beyond goals in their study, particularly when study time was very limited. These students reported that using goals caused them to learn facts efficiently but that limiting their study to goals resulted in incomplete understanding of some subject areas.

## DISCUSSION

The finding of greatest interest to the authors is that, although objectives were perceived essential early in the curriculum, they gradually decreased in usefulness throughout the four sequences. There are at least four possible explanations for the decrease.

The first potential explanation is that students use objectives less where objectives are less consistent with testing. This almost certainly is a major contributing factor to the decreased use of objectives. The use of objectives curve follows exactly the curve allowing student perceptions of how well testing matched objectives. A look at the one clerkship in which students do use objectives is worthwhile. In the OB/GYN clerkship students used objectives as much or more than they did back in Sequence I. Does testing match objectives in OB/GYN? Unfailingly. For every one of the 37 modules in the OB/GYN clerkships there is an oral evaluation asking the student to list, describe, explain, or manage hypothetical patients just as stated in the objectives. Student performance on the oral evaluations largely determines the overall evaluation for the clerkship. In other clerkships the relationship between objectives and testing is much less certain, and the weight of testing versus clinical evaluations, is considerably less.

A second possible explanation for the decrease in objectives use is that the objectives in Sequence I are the highest quality objectives, and it's downhill from there. In support for the second explanation, it is apparent from the data that students do not use objectives they perceive to be of poor quality. The medical students in this study seem to agree with Mager that objectives should be clear and concise to communicate the writer's intent, but the students have added to Mager's criteria: objectives should be narrowly focused, require only a short answer, and be sequentially and structurally matched to resource material. Students' reported that Sequence III objectives were more ambiguous and less often identified the important learning than objectives in earlier sequences.

Some of us would like to credit a third explanation, that as students proceed through the curriculum, they become more medically sophisticated, more easily distinquish what's important from what isn't, and therefore have less need for faculty prepared objectives. We have little data to support this, but students did report that in Sequence III they were better able to and tended more to formulate their own objectives. When asked whether faculty objectives were more obvious to them in Sequence III, student responses were ambivalent.

A fourth view, that objectives might be useful only for "book learning," and that the declining proportion of "book learning" from Sequence I to Sequence III accounts for the declining use of objectives, received little support in this study. Students attributed little importance to reduced "book learning" in Sequence III as a reason for reduced goal usage. In most clerkships, although the proportion of learning which centers on books is reduced by the magnitude of the clinical components, the amount of learning from books remains substantial.

On balance, congruence between objectives and evaluation appears to be the major factor in accounting for decreasing reliance on objectives as the curriculum progressed. However, the issue of quality is intimately related. We suspect that the objectives in the SIU curriculum which are regarded as high quality were written by faculty who are also careful to maintain concordance between their objectives and the test items they construct. One student, taking an elective on teaching, told us that she could often tell by examining the module objectives whether testing would be consistent with the objectives. If the objectives were not clear enough for her to predict what test items would follow, she interpreted that the faculty member didn't take objectives seriously and therefore wouldn't refer to them in developing the tests.

One other point must be made. Although consistency between objectives and testing can be achieved in the clinical years, consistency of objectives with evaluation is more difficult to achieve. The OB/GYN clerkship shows that consistency with testing is sufficient to assure use of the objectives. But if objectives are only associated with modules and modules only with knowledge-level learning, then to that extent objectives have not played a significant role in the unique kinds of learning which can occur in the clinical years.

Where does the Department of Medical Education at SIU go with this? As we work with faculty we will reduce our direct emphasis on thoroughly and very clearly defining and redefining objectives, and place considerably more emphasis on the other elements of the instructional system - assuring that evaluation,

whether clinical or non-clinical, is appropriate to the objectives and that instructional experiences are appropriate to both objectives and evaluation. Actually using the objectives to derive both the evaluations and the teaching activities will lead faculty to recognize and correct the ambiguities, fuzziness, and wishful thinking in their objectives more effectively than persuasion, and at the same time make the teaching and evaluating portions of the system work better.

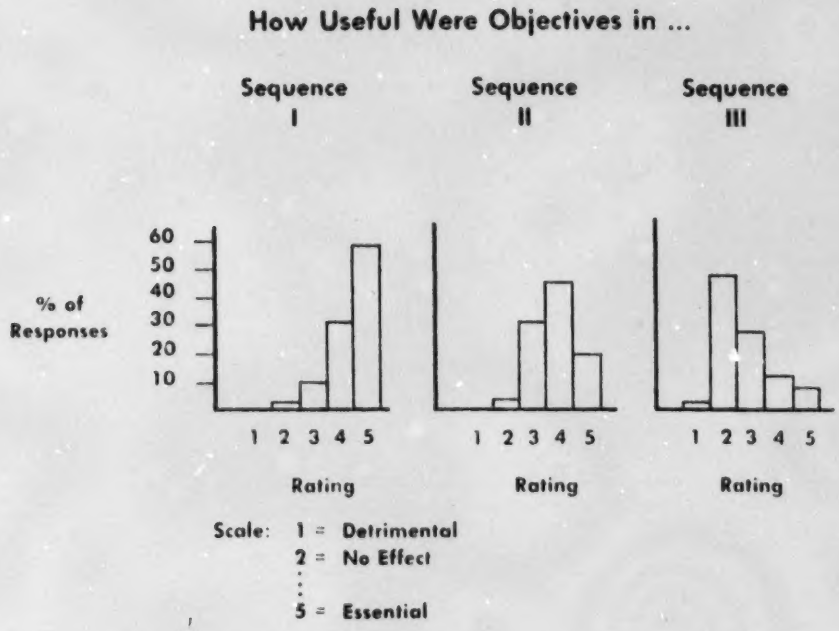


Figure 1. MEDICAL STUDENT RATINGS OF THE USEFULNESS OF OBJECTIVES IN BASIC SCIENCES (SEQUENCES I AND II) AND CLINICAL INSTRUCTION (SEQUENCE III). N = 103

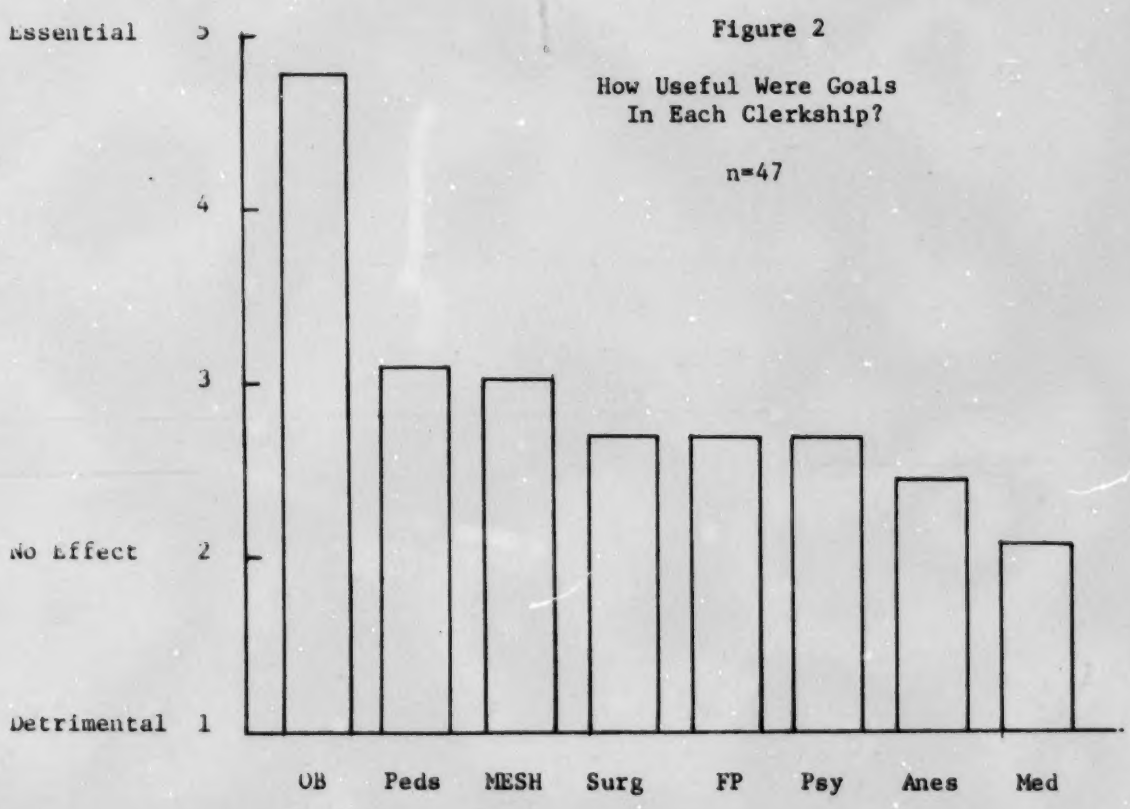


**Figure 2**

**How Useful Were Goals In Each Clerkship?**

**n=47**

TABLE 1

MEDICAL STUDENT REASONS FOR USING OBJECTIVES LESS IN CLINICAL (SEQUENCE III) THAN IN BASIC SCIENCE INSTRUCTION (SEQUENCES I AND II)

| Reason | Percent of student rating reason as very important. (N = 56) |
|---|---|
| Goals were not generally tested in Sequence III. | 68 |
| Sequence III faculty minimized the importance of goals. | 63 |
| Goals did not identify the important learning for Sequence II. | 47 |
| Sequence III goals were more ambiguous than Sequence I and II goals. | 40 |
| By Sequence III I felt competent to formulate my own objectives. | 33 |
| For learning related to patients the goals were obvious. | 31 |
| Goals relate only to testing, but Sequence III evaluations are based primarily on clinical performance. | 29 |
| Goals implied in Sequence III texts provide all the direction students need. This is less true in Sequences I and II. | 16 |
| Goals are less relevant in Sequence III because there is less "book-learning." | 15 |
| For learning related to modules the goals were obvious. | 8 |

TABLE 2

MEDICAL STUDENTS' METHODS OF USING OBJECTIVES IN BASIC SCIENCES (SEQUENCE I & II) AND CLINICAL INSTRUCTION (SEQUENCE III)

| | Mean Ratings* in: (N = 56) | | |
|---|---|---|---|
| | Sequence I | Sequence II | Sequence III |
| Read goals before initial reading of study material. | 4.21 | 3.73 | 2.16 |
| Wrote answers to all goals while reading material. | 3.00 | 2.63 | 1.80 |
| Wrote answers to all goals after reading material. | 3.11 | 2.60 | 1.64 |
| Wrote answers to some goals shared with study group. | 4.21 | 2.40 | 1.14 |
| Self-tested with goals after reading material. | 3.77 | 3.28 | 2.14 |
| Limited my reading to sections pertaining to goals. | 3.19 | 2.73 | 1.79 |
| Read study group answers to goals instead of material. | 2.14 | 1.40 | 1.07 |
| Formulated my own goals in addition to those provided. | 2.27 | 2.47 | 3.31 |
| Reread material after reading study group answers to goals. | 3.00 | 2.24 | 1.57 |

* On a scale of 1 = Never to 5 = Always

TABLE 3

FACTORS INFLUENCING MEDICAL STUDENTS' USE OF OBJECTIVES*

| | MEAN 1978 N = 47 | MEAN 1979 N = 56 | OVERALL MEAN N = 103 | OVERALL MODE N = 103 |
|---|---|---|---|---|
| Expectation that goals would be tested | 4.57 | 4.41 | 4.48 | 5 |
| Clear concise goals | 4.20 | 4.38 | 4.29 | 5 |
| Goals match material well | 4.18 | 4.34 | 4.26 | 5 |
| Frequent testing | 4.02 | 4.34 | 4.20 | 5 |
| Shortage of time | 3.74 | 4.20 | 3.99 | 5 |
| Goals requiring one-word answers | 3.89 | 3.61 | 3.74 | 4 |
| Expectation of M/C tests | 3.04 | 3.23 | 3.15 | 3 |
| Large number of goals | 2.67 | 3.43 | 3.09 | 3 |
| Prior knowledge of material | 2.78 | 2.59 | 2.68 | 3 |
| Interest in the material | 2.35 | 2.43 | 2.39 | 1 |
| Few broad goals | 1.93 | 1.73 | 1.82 | 1 |

*On a scale of 1 = "Decreased my use of objectives" to 5 = "Increased my use of objectives".

TABLE 4

MEDICAL STUDENT AGREEMENT WITH STATEMENTS ABOUT OBJECTIVES*

| STATEMENTS | MEAN 1978 N = 47 | MEAN 1979 N = 56 | OVERALL MEAN N = 103 | OVERALL MODE N = 103 |
|---|---|---|---|---|
| You were tested only over the goals in Sequence I. | 3.96 | 3.85 | 3.90 | 4 |
| You were tested only over the goals in Sequence II. | 3.38 | 3.21 | 3.29 | 4 |
| You were evaluated only over the goals in Sequence III.+ | - | 1.19 | 1.19 | 1 |
| There should be greater emphasis on goals in Sequence III.# | 2.68 | - | 2.68 | 1 |
| There should be greater emphasis on goals in Sequence IV.# | 2.00 | - | 2.00 | 1 |
| Goals helped improve your learning of factual material. | 4.11 | 3.96 | 4.03 | 4 |
| Goals helped improve your conceptual understanding of material. | 3.26 | 3.18 | 3.21 | 3 |
| The goals helped you integrate your knowledge. | 3.04 | 3.37 | 3.21 | 4 |
| Goals promoted efficient use of your study time. | 4.17 | 4.20 | 4.18 | 4 |
| Goals primarily helped you pass tests. | 3.53 | 3.67 | 3.60 | 4 |
| Some subjects lend themselves to goals.# | 4.64 | - | 4.64 | 5 |
| You usually went beyond the goals.# | 3.63 | - | 3.63 | 4 |
| Having goals reduced your test anxiety. | 3.66 | 3.61 | 3.63 | 4 |
| If you teach, you will write goals. | 3.85 | 3.82 | 3.84 | 4 |
| Using goals has helped prepare you for independent learning. | 3.38 | 3.44 | 3.41 | 4 |
| You set your own goals in Sequence IV.# | 4.22 | - | 4.22 | 5 |

* On a scale of 1 = DISAGREE to 5 = AGREE.

+ Only included on 1979 questionnaire.

# Only included on 1978 questinnaire.